

AMENDMENTS TO THE CLAIMS

This listing of changes will replace all prior versions, and listings, of claims in the specification:

Listing Of Claims

Claims 1-29: Cancelled

30. (New) A method of deriving vehicle torque comprising; measuring cylinder pressure during a cylinder cycle; constructing a pressure variation function; obtaining work done by the engine therefrom and deriving vehicle torque from the work done.

31. (New) A method as claimed in claim 30 further including identifying vehicle motive efficiency losses and subtracting these from engine work done to derive vehicle torque.

32. (New) A method as claimed in claim 30 in which the vehicle motive efficiency loss is derived from a map and/or model.

33. (New) A method as claimed in claim 30 further comprising controlling vehicle performance by adjusting a performance input variable to control the derived vehicle torque to a target vehicle torque.

34. (New) A method as claimed in claim 30 further comprising deriving loss from the difference between the measure of engine shaft output and the measure of work done on a piston in the cylinder.

35. (New) An engine management system for an internal combustion engine having at least one cylinder pressure sensor and a data processor arranged to receive the pressure measurements during a cylinder cycle from the cylinder pressure sensor and process the measured pressure according to the method of claim 30.

36. (New) An engine management system for an internal combustion engine having at least one cylinder pressure sensor and at least one engine actuator and a data processor arranged to receive pressure measurements during a cycle from the cylinder pressure sensor and an actuator controller arranged to control the actuator according to a performance input variable to carry out a method as claimed in claim 30.

37. (New) A computer readable medium containing processing instructions to enable a processor to carry out a method as claimed in claim 30.

38. (New) A method as claimed in claim 31 in which vehicle motive efficiency loss is measured by skip firing an engine cylinder cycle and measuring corresponding vehicle deceleration.

39. (New) A method as claimed in claim 32 in which the derived vehicle motive efficiency loss is correlated against the measured vehicle motive efficiency loss to refine the map or model.

40. (New) A method as claimed in claim 34 further comprising adjusting a performance input variable to control the measure of engine shaft output to a target value or range to obtain a target measure of engine shaft output.

41. (New) A method as claimed in claim 40 further comprising monitoring vehicle performance by obtaining separately a measure of engine shaft output and/or engine friction losses estimate and comparing the or each estimate against the respective derived value to correct the estimate.

42. (New) A method as claimed in claim 41 further comprising controlling vehicle performance by adjusting a performance input variable to control the derived measure of engine shaft output to a target measure of engine shaft output.

43. (New) A method of deriving engine cylinder top dead centre comprising measuring cylinder pressure during a cylinder cycle, constructing a pressure variation function and deriving top dead centre therefrom.

44. (New) A method as claimed in claim 43 in which the devised top dead centre is a thermodynamic top dead centre is derived at a maximum pressure point of the motoring pressure curve.

45. (New) A method as claimed in claim 44 in which the motoring pressure is derived by skip firing an engine cylinder.

46. (New) A method as claimed in claim 44 in which the maximum pressure is interpolated from the motoring pressure curve.

47. (New) A method as claimed in claim 44 in which the mechanical top dead centre is obtained by applying an offset to the thermodynamic top dead centre.

48. (New) A method as claimed in claim 47 in which the offset is derived from a map or model.

49. (New) A method of obtaining the indicated mean effective pressure IMEP for a vehicle engine cylinder comprising measuring the cylinder pressure during a cylinder cycle, obtaining corresponding values of cylinder volume during the cycle, deriving top dead centre during the cycle, correcting the volume values based on the derived value of top dead centre, and integrating pressure against volume to obtain the IMEP.

50. (New) A method as claimed in claim 49 in which top dead centre is derived at a maximum pressure point of the motoring pressure curve.

51. (New) A method as claimed in claim 49 further comprising controlling vehicle performance deriving a vehicle performance output value from the IMEP and adjusting a vehicle performance input variable to control the derived vehicle performance output value to a target vehicle performance output value.

52. (New) A method as claimed in claim 43 further comprising controlling the timing of a combustion event in an engine cylinder by obtaining a combustion timing control value as a function of the derived top dead centre.

53. (New) A method as claimed in claim 52 in which a combustion event comprises a spark induced event or a compression induced event.

54. (New) A method of diagnosing engine conditions in an engine with two or more cylinders comprising the steps of skip firing individual cylinders, deriving a measure of engine friction loss and comparing the derived loss to diagnose a respective cylinder condition.